be free from error, and, furthermore, I am quite aware that one should consider species and genera rather than groups. *But yet I venture with due respect to direct attention to the subject in the hope that zoologists who are dealing with plankton will not confine their attention merely to the adult groups of the same, but will, in addition, arrange for the examination of the larvæ therein in view of the distribution of the different groups of littoral animals.*

Considering each side of the question, remembering in particular the faunas of oceanic banks, so far as we know them, I venture to suggest that there are no banks to which an abundant variety of Crustacean larvæ cannot pass, that the maximum regular passage for Echinoderm (not Crinoid) and Enteropneust larvæ is about twenty days, while for Sipunculids, Annelids, Mollusca, and Crinoidea it is progressively less, the series passing on to Müller's larva, found in the Turbellaria, and ending with regular planulæ not as a rule exceeding more than four or five days of oceanic life, and probably in many forms averaging much less.

Take the Chagos Archipelago as a case in point. Crustacean larvæ should reach it freely from the Seychelles or Africa and Australia, and the Crustacean faunas of the three localities should be approximately the same for all forms of the group possessing larval development. Many of the Echinoderms and Enteropneusta should be common to the Seychelles and Western Australian, but the Chagos forms might reasonably be expected to show some small variations from their possibly parent stocks on either side. These differences should be progressively more important in Sipunculids, Chætopods, and Echiuroids, while the corals and Turbellaria should have no more resemblance to those of the Australian than to those of the African shore, and should for the most part, indeed, have begun to take on forms which are distinct varieties or subspecies of those found in the Seychelles.

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LV.—*The Butterflies of the Group* Callidryades *and their Seasonal Phases.* By Arthur G. Butler, Ph.D., F.L.S., F.Z.S., &c.

Between the years 1897 and 1899 I revised a number of genera of Pieridine Butterflies in the pages of the 'Annals,' and indicated their seasonal phases; but I unaccountably

omitted to include the *Callidryades*. Perhaps, as the group contained no undescribed species, I hardly felt justified in occupying official time upon it whilst other groups urgently needed attention. Now that I have time to spare, I think it advisable to point out that many of the supposed species recorded in my 'Monograph of *Callidryas*,' published in 1873, as well as one or two described subsequently, are unquestionably only seasonal phases of other species.

I have been asked recently, as in the past I asked others,—"How do you know that these forms which you put together are only phases of one species?"

When we take up the study of any branch of natural science we find that Nature works by rule. It is now known definitely that among the Satyrinæ the wet phases are ornamented with well-defined ocellated spots, which in the dry phases are either greatly reduced in size (the pupils alone being left in some cases) or are wanting altogether.

In some butterflies the wet phases have the apex of the primaries produced into a long process, which is greatly reduced or wanting in the dry phases. In many the under surface of the wings in the wet phase has a defined pattern in brilliant colours, whereas in the dry phase this surface is blurred and so coloured as to resemble a decaying or withered leaf.

In the Pierinæ all silver spots tend to disappear from the under surface in the dry phase; as a rule, heavy borders or conspicuous markings disappear or become less prominent; in many species pink or sandy colouring is seen on the secondaries and the apical area of the primaries below. In a word, the butterfly is so coloured as to be least conspicuous amongst its dry surroundings.

Enough species have been bred by experienced field-entomologists to prove that these marked differences are authentic; therefore, when we compare two forms from the same locality which only differ precisely as the seasonal phases of one species ought to differ, and particularly when we find individuals of one of these forms which in some of their characters show gradation towards the others, we are fully justified in concluding that they are conspecific.

When a wet or a dry phase is not required for the preservation of a species, it tends to disappear, so that the insect eventually becomes monomorphic; but in some cases all the gradations between the extreme phases persist and the species becomes polymorphic, as in *Precis archesia*, which exhibits seven fairly defined gradations.

The typical *Callidryades* are now divided into six genera,

though some of these, being founded upon secondary sexual characters, would be regarded perhaps as subgenera. With the exception of *Rhabdodryas* (subsequently characterized) I indicated the structural distinctions in my 'Monograph of *Callidryas*.'

Callidryas, Boisd.

The following species are evidently seasonal phases :—

Wet phase.	Dry phase.
C. avellaneda, Herr.-Sch.	*C. solstitia*, Butl.

In *C. thalestris* and *C. philea* the seasonal phases are ill-defined ; in *C. fornax* and *editha* we know only one phase.

C. sennæ, Linn.	*C. drya*, Fabr.

In my Monograph these two phases are figured side by side on pl. vi., so that the differences can be readily seen. The species ranges over South and Central America and the West Indies. Of the nearly related *C. eubule*, Linn., from North America, the seasonal phases differ very slightly, if at all, from each other.

By several entomologists *C. eubule* has been confounded with *C. sennæ*, but apart from its ill-defined summer and winter phases, it is longer in wing and invariably sulphur-yellow in both sexes. I should as soon think of uniting *C. thalestris* and *philea* as *C. sennæ* and *eubule*.

Parura, Butler.

Wet phase.	Intermediate phase.	Dry phase.
P. rurina, Feld.	*P. intermedia*, Butl.	*P. virgo*, Butl.

In this species the phases are remarkably distinct, but in the smaller *P. bracteolata*, Butl., *neocypris*, Hübn., and *irrigata*, Butl. (which are nearly related to each other), the dry phase seems to be characterized only by the much reduced markings on the under surface.

Rhabdodryas, Salv. & Godm.

In the sole species (*R. trite*, Linn.) the black outer border is obliterated in the dry phase, and the markings below are all ill-defined or reduced in width.

Phœbis, Hübn.

In *P. agarithe*, Boisd., the phases are not well-defined, but the dry phase has the under-surface markings reduced ; there

seems also to be a tendency to reduction in size in both sexes as well as of the black and orange markings on the upper surface of the female.

Wet phase.	Dry phase.
P. cipris, Cram.	*P. argante*, Fabr.

In the dry phase the black border on the upper surface is much reduced, often only indicated by dots in the male; the silver spots disappear from the under surface of the male and the pearly-purplish and bluish patches from the same surface of the female.

In the insular *P. rorata*, Butl., there appears to be only one phase.

Aphrissa, Butl.

Of *A. neleis*, Boisd., *A. Wallacei*, Feld., *A. jada*, Butl., *A. orbis*, Poey, *A. hartonia*, Butl., and *A. Godartiana*, Swains., I know only one phase. *A. hartonia* and *Godartiana* are insular forms somewhat nearly related, and will doubtless be regarded as subspecies of one type by lepidopterists of the present day; they are, however, absolutely constant to locality, which is more than can be said of the myriad individual sports and aberrations now being raised to equal rank with insular forms by the advocates of trinomial nomenclature.

Wet phase.	Dry phase.
A. statira, Cram.	*A. fabia*, Fabr. = *Boisduvalii*, Feld.

There are two very pretty intermediate males from Panama in the British Museum collection.

A. jaresia, Butl., is evidently a highly coloured form of the female (wet phase): an integrade from this to the normal female is in the Museum collection.

Catopsilia, Hübn.

Wet phase.	Dry phase.
C. pomona, Fabr.	*C. crocale*, Cram.

C. phlegeus, Wall., and *C. heera*, Swinh., are intermediate wet phases; and *C. jugurtha*, Cram., *jugurthina*, Godt., and *endeer*, Boisd., intermediate dry phases. It is possible that the numerous intergrades between the extreme phases of this butterfly are due to the fact that evolution has, in this case, not limited the phases to their proper seasons; so that typical *C. pomona* and *crocale* may be taken *in copulâ*.

C. flava, Butl., is a dry phase from the Celebes; the wet phase resembles *C. pomona*, excepting that the discal markings

on the upper surface of the female are continued across the primaries.

Wet phase.	Dry phase.
C. thaurama, Reak.	*C. Grandidieri*, Mab.

These differ much as *C. pomona* does from *C. crocale*.

C. florella, Fabr.	*C. pyrene*, Swains.

C. aleurona, Butl., is a wet intermediate phase, and *C. hyblæa*, Boisd., dry intermediate: all four occur together and interbreed at Aden.

C. pyranthe, Linn.	*C. thisorella*, Boisd.

Oddly enough, *C. chryseis*, Drury, which is seen by the under-surface characters to be a dry type, is distinctly larger than *C. pyranthe* and quite as heavily bordered on the upper surface; the size probably has a local significance (many Chinese forms being large). Other intergrades between the extreme wet and dry phases are *C. alcyone*, Cram., *C. minna*, Herbst, and *C. ilea*, Fabr.

C. evangelina, Butl., is a representative of *C. pyranthe*, occurring in Flores, Bali Island, and Sumatra; it is a very round-winged species with a wet character of upper surface but a distinctly dry under surface.

C. nephte, Fabr., is a wet phase with a very dry aspect of upper surface; the dryest phase of it which I know is *C. gnoma*, Fabr., but it is not very marked. It seems related to *C. lactea* from Australia, of which I know only a dry phase.

C. gorgophone, Boisd.	*C. hinda*, Butl.

I have recognized only females of the dry phase, from which I should judge that the males have a much closer resemblance to those of typical *C. gorgophone*.

C. scylla, Fabr.	*C. etesia*, Hewits.

I think this last doubtful; it is quite possible that it is merely a variation with no seasonal significance.

LVI.—*Description of a new Lizard from Western Australia.* By G. A. Boulenger, F.R.S.

[Plate XI.]

Amphibolurus Websteri. (Pl. XI.)

Habit slender. Head moderately large, once and a half as long as broad; snout as long as the diameter of the orbit,